U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Admin.
NATIONAL OCEAN SERVICE
Damage Assessment Center
Florida Keys National Marine Sanctuary

DATE: 07/17/01

TO: Sharon Shutler and Martin Hindel, NOAA General Counsel
Maureen Malvern and Mara Tickett, Florida DEP Office of General Counsel

FROM: Kevin Kirsch and Sean Meehan, NOAA Damage Assessment Center, Florida Keys National Marine Sanctuary

SUBJECT: ***Miss Lori*** vessel grounding assessment report

FMP INCIDENT (CASE) #: 01-3A-5708

FMP CITATION: 000223B

NAME & DESCRIPTION OF VESSEL: *Miss Lori*, 60' Viking power vessel

VESSEL OPERATOR: Donald Taylor

DATE AND TIME OF INCIDENT: 4/22/01 @ 1015 hrs.

LOCATION OF INJURY: Broad Creek, west of Broad Key (Key Largo, FL)

LAT/LONG POSITION: N 025° 21.1894' W 080° 16.1971' (beginning of blowhole)
N 025° 21.1941' W 080° 16.1841' (end of blowhole)
N 025° 21.1936' W 080° 16.1892' (berm)

TOTAL AREA IMPACTED:

88.76 m^2 seagrass bottom cover excavated
32.13 m^2 seagrass bottom cover buried
120.89 m^2 seagrass bottom cover impacted

PHOTO/VIDEO DOCUMENTATION:

Underwater digital video shoot by Bill Goodwin

DISCUSSION: On 06/08/01 Kevin Kirsch, Sean Meehan, Bill Goodwin (FKNMS Resource Manager) and John Dotten (Environmental Specialist II) conducted an injury assessment of the grounding site of the 60' Viking power vessel *Miss Lori* (see Figures 1-4). This grounding occurred west of Broad Key on the north side of Broad Creek (See NOAA Chart # 11451 & 11462). GPS Lat/Long coordinates were taken at several points within the injury.

METHODOLOGIES

Utilizing differentially corrected, surveying-grade DGPS equipment (Trimble® Pro XR with a TSC1 Datalogger), the grounding site was mapped by physically tracing the outlines of the various injury features. The coordinates generated by the tracing work were downloaded to GPS Pathfinder® Office data processing software version 2.70 (Trimble) and then to Arcview® GIS version 3.2a (ESRI), which is used to arrive at square meter area calculations for the injury features. Depth measurements were made by passing an inflatable 8' boat back and forth over the injury equipped with a Garmin® 185 Depth Sounder integrated with a Trimble® Pro XR DGPS mounted on the stern. Depth readings taken by the Garmin are incorporated with differentially corrected positions taken by the Trimble. This information is then processed using Arcview® GIS version 3.2a with the 3D Analyst Extension resulting in a 3 dimensional view of the area. Measurements were made using the water surface as the level plane.

Community composition, percent cover and density of the benthic community, both in the injured area and in the surrounding undisturbed area, were assessed using a modified Braun-Blanquet technique (Kenworthy and Schwarzchild, 1997; Braun-Blanquet, 1932). This method involves placement of a $0.25m^2$ quadrat on the substrate and visually inspecting the content of the quadrat. The submerged aquatic vegetation (seagrass and macroalgae) and/or coral are identified and assigned a cover-abundance scale value. The scale values are: 0.0 = not present, 0.1=solitary specimen, 0.5=few with small cover, 1=numerous but less than 5% cover, 2=5-25% cover, 3=25-50% cover, 4=50-75% cover, and 5=75-100% cover. In order to determine the percent cover per individual species, as well as the total seagrass cover, the Braun-Blanquet scores by species and total cover are averaged over all of the quadrats assessed within each feature (injured area, undisturbed area). The point estimates of percentage cover corresponding to these average Braun-Blanquet scores are then calculated using the attached conversion table (see Appendix A). The loss of percent cover of seagrass as a result of the grounding can then be assessed by comparing the percent cover of the injured area to that of the undisturbed area immediately adjacent to the injury.

DESCRIPTION OF INJURY

This grounding occurred on the slope of and up onto a shallow seagrass bed characterized as a *Thalassia testudinum* dominated seagrass community. Seagrass extends down the slope of the bed and into Broad Creek. Other living components include corals (*Porites* spp.), sponges and other invertebrates typical of seagrass meadows in this area of the FKNMS, various species of macroalgae, and numerous species of fishes. The sediments consist of cohesive carbonate sands and muds, coral rubble, shell fragments and *Halimeda* algae fragments.

The injury consisted of a blowhole and a berm (see Figure 5). The blowhole travels along the slope of the seagrass bed on the north side of Broad Creek in an easterly direction for approximately 13 meters. It then turns slightly north for an additional 15 meters bringing it

farther up onto the seagrass bed. Seagrass and sediment were excavated as much as 1.6 meters below the existing seafloor (see Figure 6). Three small islands of seagrass were found within the blowhole injury. The total area excavated is calculated to be 88.76 m^2. A berm area of excavated material covering 32.13 m^2 was found to the north of the blowhole. Due to the cohesive nature of the sediments, section of sediment and seagrass were found throughout the area surrounding the blowhole injury in addition to the berm.

The total area impacted is calculated to be 120.89 m^2 of *seagrass* bottom cover, predominately *Thalassia testudinum* (Turtle grass).

Using the Braun-Blanquet technique, only one species of seagrass was noted within the injury caused by the *Miss Lori* (see Table 1). This single species comprised less than 1% of the bottom cover within the injury (see Table 2). In the surrounding undisturbed areas, only one species of seagrass was found. This area is predominately *Thalassia testudinum* (Turtle grass) with an average percent cover of 57.50%.

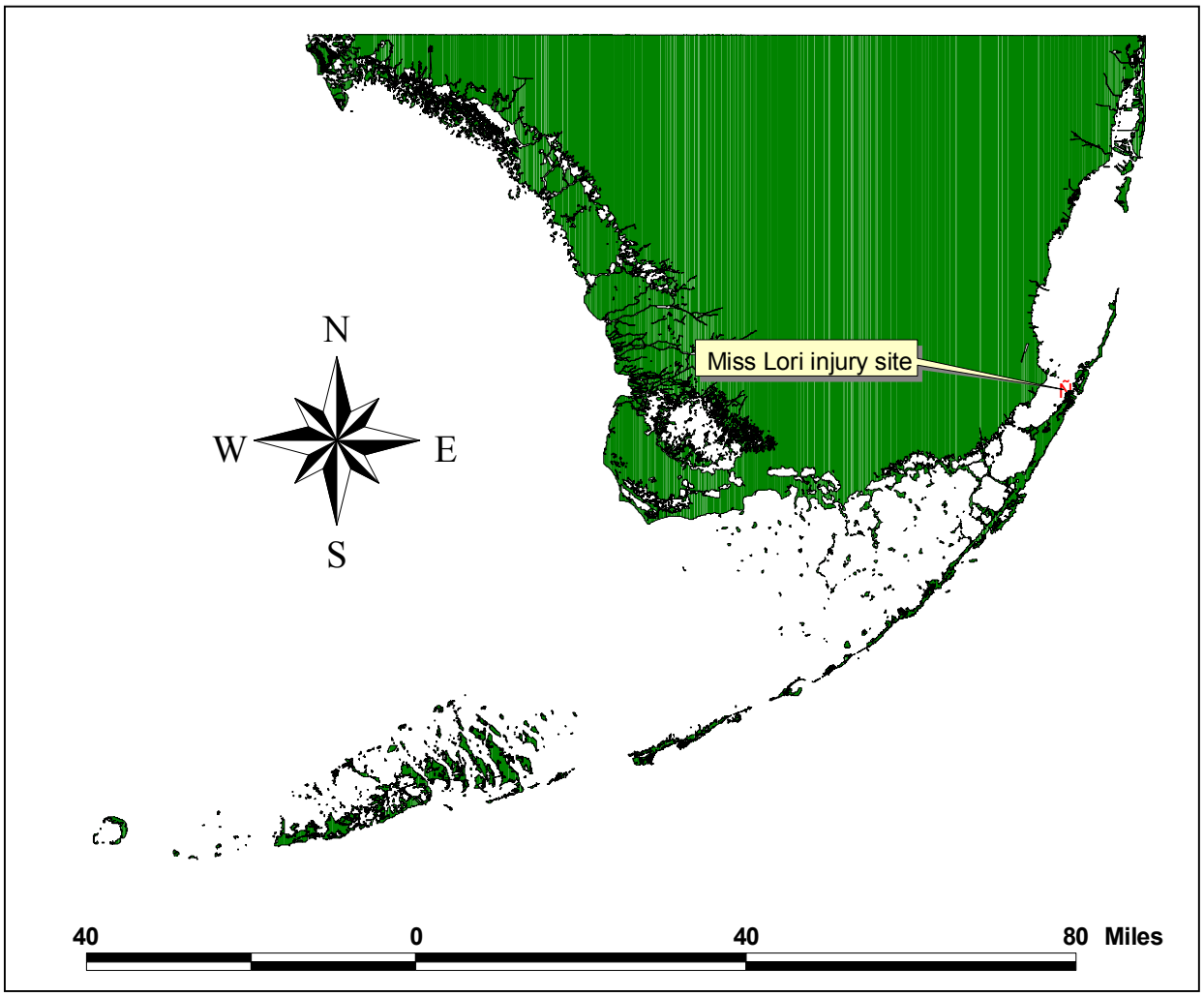

Figure 1. Location of *Miss Lori* injury site

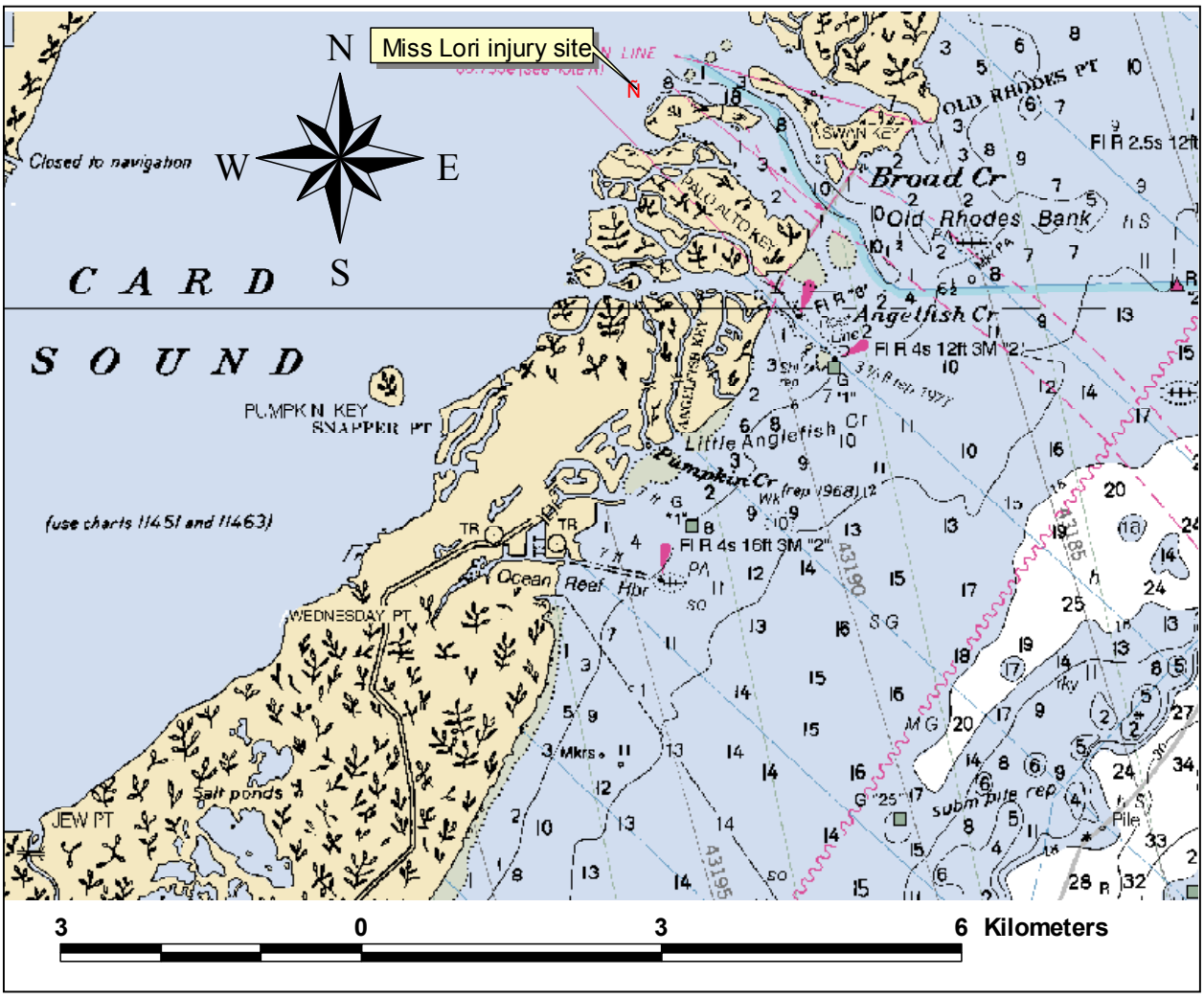

Figure 2. Location of *Miss Lori* injury site (NOAA Chart # 11462).

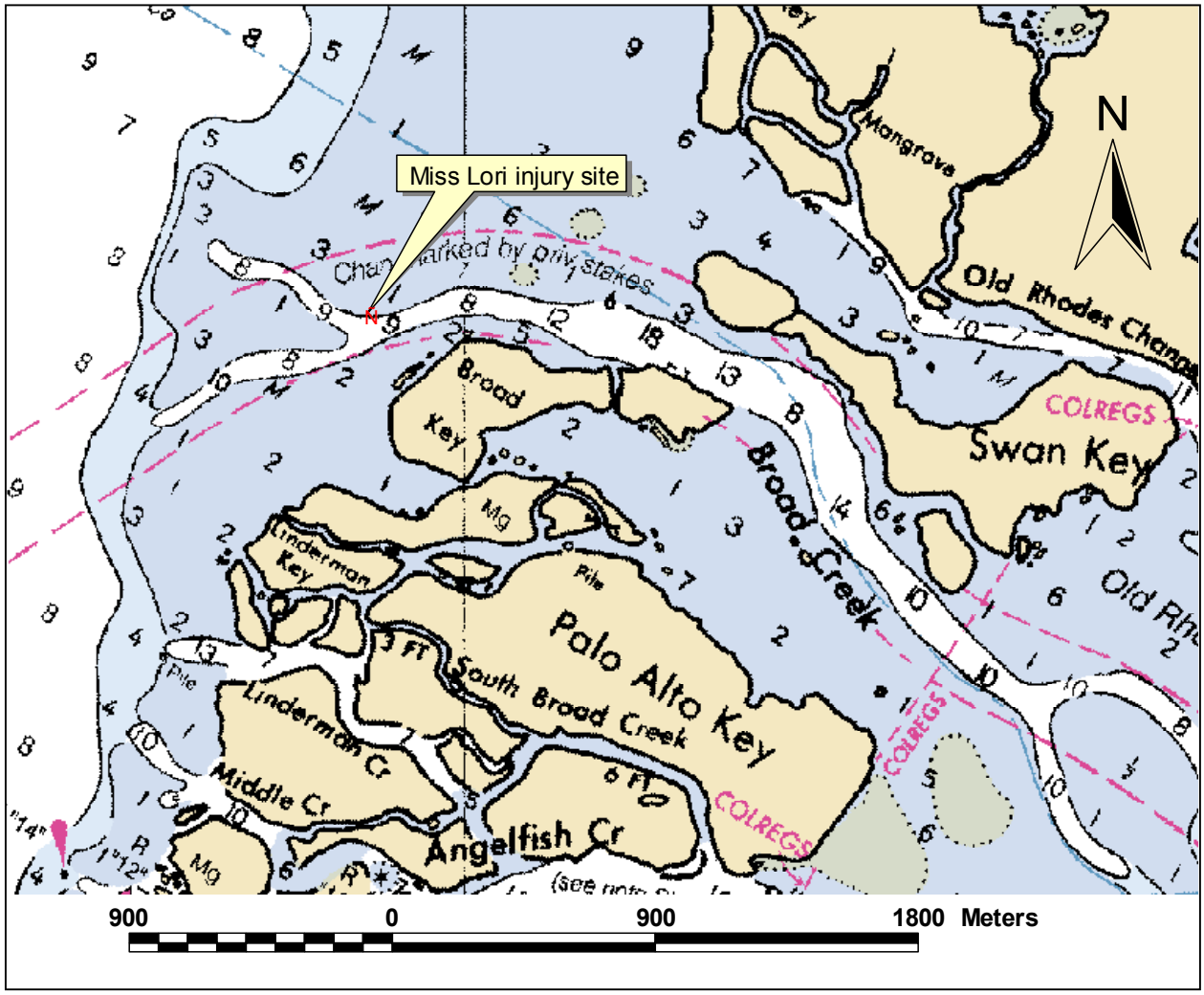

Figure 3. Close-up of location of *Miss Lori* injury site

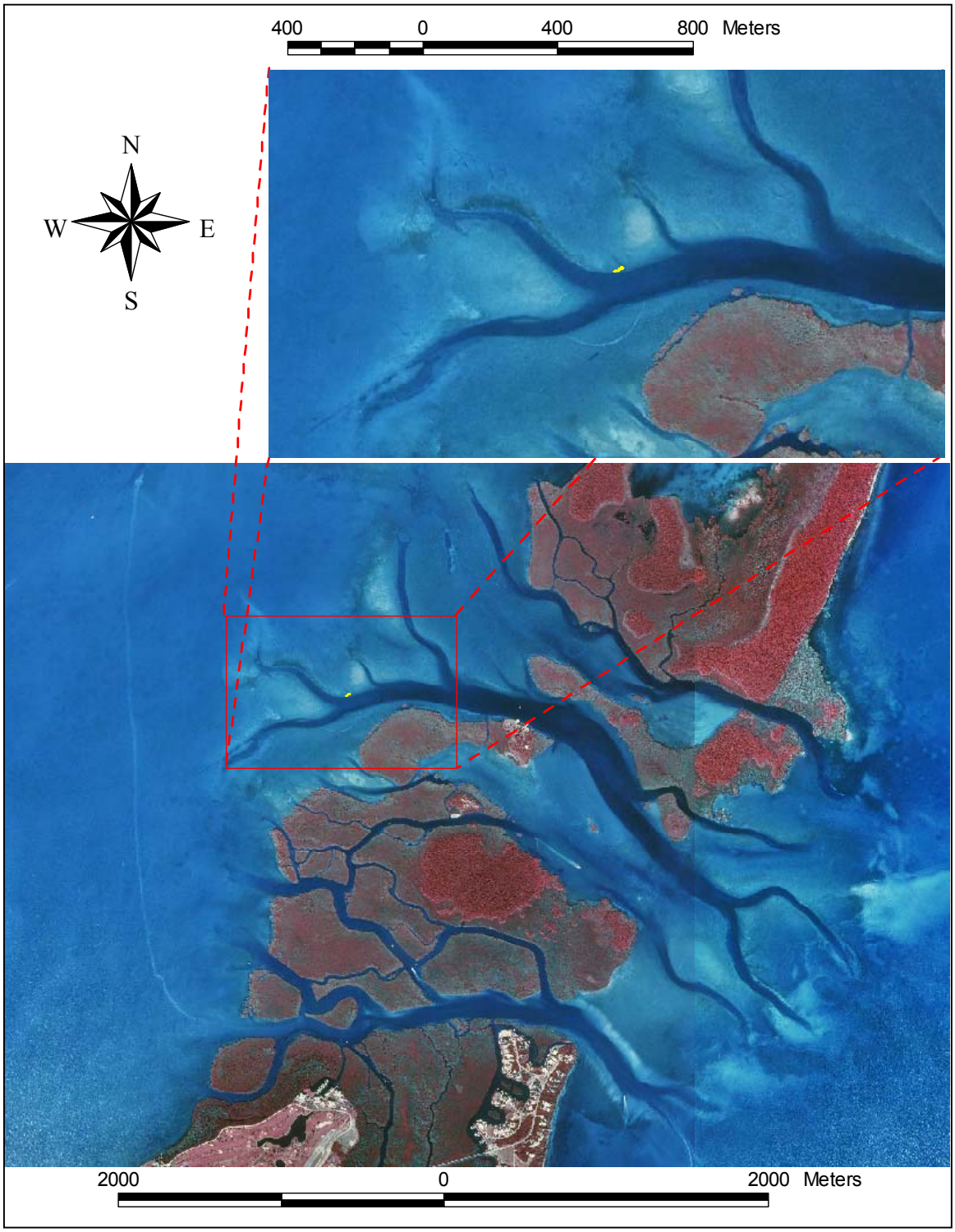

Figure 4. 1995 Digital Ortho Quarter Quad (DOQQ) of Broad Creek area with the *Miss Lori* injury superimposed in yellow. Placement of the injury is geographically correct and to scale**.**

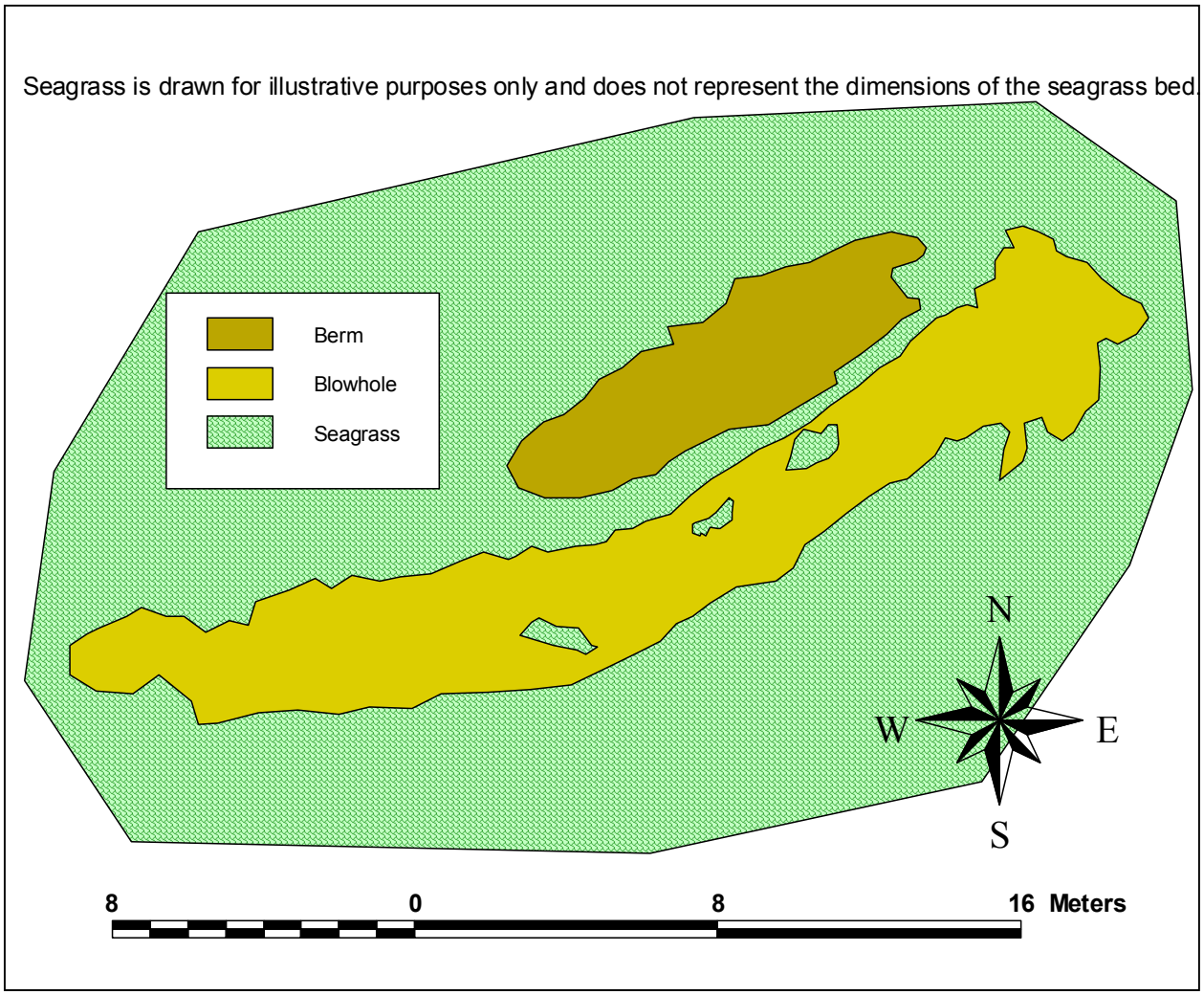

Figure 5. Physical dimensions of *Miss Lori* injury site.

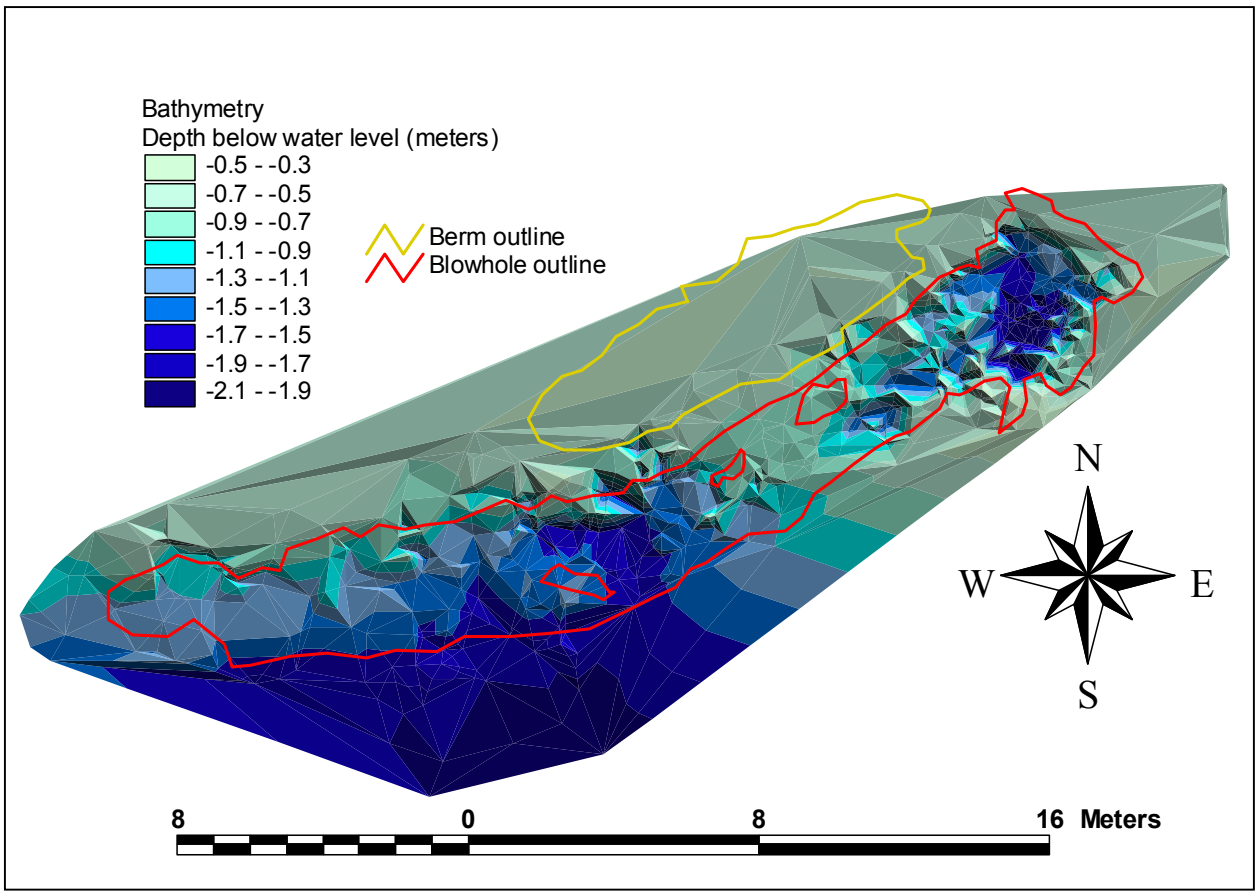

Figure 6. Bathymetry of Miss Lori injury site.

Table 1. Summary of Raw Braun-Blanquet Scores (See Braun- Blanquet scores in Appendix B)

	Species	Trench Scar	Berm Scar	Control
Density[1]	*T. testudinum*	0.22	0.02	3.80
	H. wrightii	0.00	0.00	0.00
	S. filiforme	0.00	0.00	0.00

1) Density = D_i = SUM (S_{ij}/n)

D_i = density of species i
j = quadrat number
S_{ij} = BB score for species i in quadrat j
n = total number of quadrats in transect

Table 2. Braun - Blanquet Scores converted into percent cover. (See Conversion Table in Appendix C)

	Species	**Inside Injury**	**Surrounding Habitat**
Percent Cover	*T. testudinum*	1.00%	57.50%
	H. wrightii	0.00%	0.00%
	S. filiforme	0.00%	0.00%
	TOTAL		**57.50%**

REFERENCES

Braun-Blanquet, J. 1932. *Plant Sociology*- the study of plant communities. G.B Fuller and H.S Conrad, Eds. Koeltz Scientific Books. Koenigstein. West Germany.

Kenworthy W.J. and A. Schwarzchild. 1997. Vertical growth and short shoot demography in *Syringodium filiforme* in outer Florida Bay, USA. Marine Ecology Progress Series. vol 173. pp. 25- 37.

Appendix A: *Miss Lori*: Braun Blanquet Damage Assessment and Habitat Characterization

Percent Cover and Services Lost

Species	Category	Relative Percent of Individual Seagrass Species	Percent Cover in Control Site	Percent Cover Remaining in Trench Scar	Percent of Services Lost in Trench Scar	Percent Cover Remaining in Berm Scar	Percent of Services Lost in Berm Scar
T. testudinum	Density	100.00%	57.50%	1.00%	56.50%	1.00%	56.50%
H. wrightii	Density	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
S. filiforme	Density	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total		100.00%	**57.50%**				

Average Braun Blanquet Scores

Species	Category	Trench Scar	Berm Scar	Control
T. testudinum	Density	0.22	0.02	3.80
H. wrightii	Density	0.00	0.00	0.00
S. filiforme	Density	0.00	0.00	0.00

Prepared by: **NOAA Damage Assessment Center, Marathon, FL**

Appendix B: *Miss Lori* - Blanquet Scores

Quad #	Injury	*T.t.*	*S.f.*	*H.w.*	Total Grass	TMA	Coral	Time	IB/OB	Sed. Type
1	C	4	0	0	4	0.5	1	1150	IB	CS/M
2	C	3	0	0	3	0.5			IB	CS/M
3	C	4	0	0	4	0.5			IB	CS/M
4	C	4	0	0	4	0.5			IB	CS/M
5	C	4	0	0	4	0.5			IB	CS/M
6	C	4	0	0	4	0.1			IB	CS/M
7	C	5	0	0	5	0.1		1200	IB	CS/M
8	C	4	0	0	4	0.1			IB	CS/M
9	C	4	0	0	4	0.1			IB	CS/M
10	C	5	0	0	5	0.1			IB	CS/M
11	C	5	0	0	5	0.1			IB	CS/M
12	C	4	0	0	4	0.1			IB	CS/M
13	C	4	0	0	4	0.1			IB	CS/M
14	C	2	0	0	2	0.1		1210	IB	CS/M
15	C	2	0	0	2	0.1			IB	CS/M
16	C	3	0	0	3	0.1			IB	CS/M
17	C	4	0	0	4	0.1			IB	CS/M
18	C	4	0	0	4	0.1			IB	CS/M
19	C	4	0	0	4	0.1			IB	CS/M
20	C	3	0	0	3	0.1			IB	CS/M
Average		**3.8**	**0**	**0**	**3.8**	**0.2**				
21	BH	0	0	0	0	0			IB	CS/M
22	BH	0	0	0	0	0			IB	CS/M
23	BH	0.5	0	0	0.5	0.1			IB	CS/M
24	BH	0	0	0	0	0.1			IB	CS/M
25	BH	0.5	0	0	0.5	0.1			IB	CS/M
26	BH	0.5	0	0	0.5	0			IB	CS/M
27	BH	1	0	0	1	0.5			IB	CS/M
28	BH	0.5	0	0	0.5	0.1			IB	CS/M
29	BH	0.1	0	0	0.1	0.1			IB	CS/M
30	BH	0.1	0	0	0.1	0			IB	CS/M
31	BH	0	0	0	0	0			IB	CS/M
32	BH	0	0	0	0	0			IB	CS/M
33	BH	0	0	0	0	0			IB	CS/M
34	BH	0	0	0	0	0			IB	CS/M
35	BH	0.1	0	0	0.1	0			IB	CS/M
Average		**0.22**	**0**	**0**	**0.22**	**0.06**				
36	BM	0.1	0	0	0.1	0			IB	CS/M
37	BM	0	0	0	0	0.1			IB	CS/M
38	BM	0	0	0	0	0			IB	CS/M
39	BM	0	0	0	0	0			IB	CS/M
40	BM	0	0	0	0	0			IB	CS/M
Average		**0.02**	**0**	**0**	**0.02**	**0.02**				

KEY TO ABBREVIATIONS

Species:
T.t. = Thalassia testudinum
S.f. = Syringodium filiforme
H.w. = Halodule wrightii
TMA = Total Macroalgae

Sediment Types:
LC = Live Coral
MS = Muddy Sand
SM = Sandy Mud
R = Rock

Injury Regions:
M= Mud
CS = Coarse Shell
HH = Halimeda Hash
R = Rubble
TR = Trench
BH = Blow Hole
BM = Berm
C = Control (Reference)

Appendix C: Braun-Blanquet Score to Percent Cover Conversion Tables

Interpolation of the Mid-Point of BB Scores			
BB Score	% Cover	BB Score	% Cover
0.00	0.00%	2.60	28.50%
0.10	1.00%	2.70	30.75%
0.20	1.00%	2.80	33.00%
0.30	1.00%	2.90	35.25%
0.40	1.00%	3.00	37.50%
0.50	1.00%	3.10	40.00%
0.60	1.00%	3.20	42.50%
0.70	1.00%	3.30	45.00%
0.80	1.00%	3.40	47.50%
0.90	1.00%	3.50	50.00%
1.00	2.50%	3.60	52.50%
1.10	3.75%	3.70	55.00%
1.20	5.00%	3.80	57.50%
1.30	6.25%	3.90	60.00%
1.40	7.50%	4.00	62.50%
1.50	8.75%	4.10	65.00%
1.60	10.00%	4.20	67.50%
1.70	11.25%	4.30	70.00%
1.80	12.50%	4.40	72.50%
1.90	13.75%	4.50	75.00%
2.00	15.00%	4.60	77.50%
2.10	17.25%	4.70	80.00%
2.20	19.50%	4.80	82.50%
2.30	21.75%	4.90	85.00%
2.40	24.00%	5.00	87.50%
2.50	26.25%		

BB Score	Mid-Point Range
<1= <1%	<1= 1%
1=1%-5%	1=2.5%
2= 5%-25%	2=15%
3= 25%-50%	3=37.5%
4= 50%-75%	4=62.5%
5= 75%-100%	5=87.5%